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CITIZENSHIP : REPUBLIC OF KOREA

Translation of Priority Document

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COMMISSIONER

ABSTRACT OF THE DISCLOSURE
[ABSTRACT]

Disclosed is a method of informing charging data to a mobile terminal in a code division multiple access (CDMA) type or time division multiple access (TDMA) type mobile radio communication system which enables a mobile terminal subscriber to immediately confirm telephone charges of the mobile terminal. According to the method, a mobile communication exchange detects termination of a telephone call of a mobile terminal, and the mobile communication exchange produces charging information for the telephone call and informs the charging information to a charging center. The charging center calculates the telephone charge using the charging information and informs the calculated telephone charge to the mobile communication exchange, and the mobile communication exchange transmits the telephone charge information to a mobile terminal.

[REPRESENTATIVE FIGURE]

FIG. 3

[TITLE OF THE INVENTION]

METHOD OF INFORMING CHARGING DATA TO MOBILE TERMINAL IN MOBILE RADIO COMMUNICATION SYSTEM

[BRIEF DESCRIPTION OF THE DRAWINGS]

The above objects and advantages of the present invention will become more apparent by describing in detail the preferred embodiments thereof with reference to the attached drawings in which:

FIG. 1 is a block diagram illustrating the construction of a conventional mobile radio communication system;

FIG. 2 is a block diagram illustrating the construction of a mobile radio communication system incorporating the present invention;

FIG. 3 is a flowchart illustrating a method of informing a mobile terminal of a telephone charge for a telephone call and the total telephone charge when the telephone call terminates according to an embodiment of the present invention; and

FIG. 4 is a flowchart illustrating a method of informing a mobile terminal of the total telephone charge in the case that the mobile terminal requests confirmation of the total telephone charge up to now in a standby state according to another embodiment of the present invention.

[DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT]
[OBJECT OF THE INVENTION]
[RELATED FIELD AND PRIOR ART OF THE INVENTION]

The present invention relates to a method of informing charging data to a mobile terminal in a code division multiple access (CDMA) type or time division multiple access (TDMA) type mobile radio communication system which enables a mobile terminal subscriber to immediately confirm through his/her mobile terminal telephone charges of the mobile terminal calculated and managed by a charging center.

Mobile communication systems are provided for moving objects such as persons, automobiles, ships, trains, airplanes, etc. Specifically, the mobile

communication system includes mobile telephones such as portable telephones or telephones for vehicles, harbor telephones, telephones for airplanes, and mobile public telephones installed in excursion ships, express buses, etc. The mobile communication system also includes radio pagers, radio telephones, satellite mobile communications, amateur radios, fishery radios, etc.

An advanced mobile phone service (AMPS) system is an analog type mobile communication system. A CDMA system, TDMA system, etc., are digital type mobile communication systems.

FIG. 1 is a block diagram illustrating the construction of a conventional mobile radio communication system.

Referring to FIG. 1, a mobile communication exchange 120 performs an exchange function in a manner that it interworks with another mobile communication exchange, or it connects with a different communication network such as a PSDN and controls a call termination/origination of a mobile terminal 100. Also, the mobile communication exchange 120 informs a charging center 130 of charging information of a telephone call such as a subscriber number, terminating number, call start time, call termination time, discount information and so forth when the call from the mobile terminal 100 terminates. The charging center 130 calculates and manages telephone charges using the charging information. For example, if thirty days elapse, the charging center 130 calculates an accumulated telephone charge for the calls made during the period for each mobile terminal subscriber, and notifies by mail the respective mobile terminal subscriber of the total charge, wherein a basic charge and a tax are added to the calculated telephone charge, in the form of a bill 150.

According to the conventional mobile communication system as described above, however, just after the mobile terminal subscriber terminates a telephone call, he/she cannot know the charge for the call, the accumulated telephone charge till then,

or the total telephone charge instantly.

In order to solve the above problem, a mobile terminal having a built-in charging device has been developed. This charging device obtains call time information (i.e., call start time and call termination time) using a timer (not illustrated) provided in the mobile terminal. Typically, the timer is used to inform the mobile terminal subscriber of the call time through an output device (for example, a liquid crystal display) of the mobile terminal.

The timer starts its operation at the pointer of time when the mobile terminal detects a ring back tone transmitted to the mobile communication exchange, and there exists a difference between this time and an actual telephone call time. Thus, the telephone charge calculated by the charging device has an error in comparison to the telephone charge actually imposed to the mobile terminal subscriber. Also, since the discount rate may be different according to kinds of services such as the grade of the subscriber, an accurate telephone charge cannot be known if such a discount rate is not considered. Also, though the telephone charge, which is imposed to the mobile terminal subscriber after a predetermined period elapses, for example, a 30 day period, elapses, includes the basic charge, tax, etc., it is difficult to implement the charging device, considering such terms, and thus only the pure telephone charge can be calculated by the charging device.

[SUBSTANTIAL MATTER OF THE INVENTION]

Accordingly, the present invention has been made in an effort to solve the problems occurring in the related art, and an object of the present invention is to provide a method of informing charging data to a mobile terminal in a mobile radio communication system which enables a mobile terminal subscriber to immediately confirm through his/her mobile terminal a telephone charge for a telephone call or a total telephone charge till then which is calculated by a charging center just after the mobile terminal subscriber terminates the telephone call using the mobile terminal.

It is another object of the present invention to provide a method of immediately confirming charging information managed by a charging center according to a request of a mobile terminal subscriber if the mobile terminal subscriber requests confirmation of the charging information using the mobile terminal in a standby state.

In order to achieve the above objects, according to the present invention, there is provided a first method of informing a telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of a mobile communication exchange detecting termination of a telephone call of a mobile terminal, the mobile communication exchange producing charging information for the telephone call, the mobile communication exchange informing the charging information to a charging center, the charging center calculating the telephone charge using the charging information and informing the calculated telephone charge to the mobile communication exchange, and the mobile communication exchange transmitting the telephone charge information to a mobile terminal.

In another aspect of the present invention, there is provided a second method of informing a total telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of a mobile terminal requesting confirmation of an accumulated telephone charge up to now or the total telephone charge to a mobile communication exchange in accordance with a command of the mobile terminal subscriber, the mobile communication exchange requesting the confirmation of the telephone charge for the mobile terminal subscriber to a charging center, the charging center informing the telephone charge to the mobile communication exchange, and the mobile communication exchange transmitting the telephone charge information to the mobile terminal.

[CONSTRUCTION AND OPERATION OF THE INVENTION]

The preferred embodiments of the present invention will now be explained in

detail with reference to the accompanying drawings. In the drawings, the same or similar elements are denoted by the same reference numerals even though they are depicted in different drawings. In explaining the present invention, a detailed description of known functions and configurations incorporated herein will be omitted when it may make the subject matter of the present invention rather unclear.

FIG. 2 is a block diagram illustrating the construction of a mobile radio communication system incorporating the present invention.

Referring to FIG. 2, a mobile communication exchange 120 performs an exchange function in a manner that it interworks with another mobile communication, or it connects with a different communication network such as a PSDN and controls the call termination/origination of a mobile terminal 100. Also, the mobile communication exchange 120 informs a charging center 130 of charging information of a telephone call such as a subscriber number, terminating number, call start time, call termination time, discount information and so forth when the call from the mobile terminal 100 terminates. The charging center 130 calculates and manages a telephone charge for the latest call, accumulated telephone charge, and total telephone charge using the charging information, and then informs the telephone charges to the mobile communication exchange 120. Here, the management of the telephone charges is effected in such a manner that if thirty days elapses, the charging center 130 calculates the accumulated telephone charge for the calls made during the period for each mobile terminal subscriber, and notifies by mail the respective mobile terminal subscriber of the total charge, which includes a basic charge and a tax in addition to the calculated telephone charge, in the form of a bill.

Also, the mobile communication exchange 120 transmits to the mobile terminal 100 the telephone charging information such as the telephone charge for the latest call, accumulated telephone charge, and total telephone charge transferred from the charging center 130. The mobile terminal 100 receives the telephone charging information, and displays the information on the display section (not illustrated), so

that the mobile terminal subscriber can identify it.

The mobile communication exchange 120 may be provided with a short message generating section 140. This short message generating section 140 generates a short message which corresponds to the telephone charging information such as the telephone charge for the latest call, accumulated telephone charge, and total telephone charge transferred from the charging center 130 in the form of a short message.

The kinds of telephone charges transferred from the charging center 130 can be variously determined in answer to a need of the mobile terminal subscribers in addition to the telephone charge for the latest call, accumulated telephone charge, and total telephone charge. For instance, the mobile terminal subscriber can be provided with an accumulated telephone charge for a specified time period that he/she desires from the charging center 130 using the mobile terminal 100. The kind and the number of the telephone charges transferred to the mobile terminal 100 may be predetermined or determined by the selection of the mobile terminal subscriber. For example, on the display section of the mobile terminal is displayed only the telephone charge for the latest call, only the total telephone charge, or both the telephone charge for the latest call and the total telephone charge.

FIG. 3 is a flowchart illustrating a method of informing a mobile terminal of a telephone charge for a telephone call and the total telephone charge when the telephone call terminates according to an embodiment of the present invention.

Referring to FIG. 3, the mobile communication exchange 120 detects whether the telephone call from the mobile terminal 100 terminates (step 210). If the telephone call terminates, the mobile communication exchange 120 informs the charging center 130 of the charging information for the telephone call such as a subscriber number, terminating number, call start time, call termination time, discount information and so forth (step 220). The charging center 130 calculates the charge for the latest call, and

adds the calculated charge to the total telephone charge till then (step 230). The total telephone charge is calculated by adding up the accumulated telephone charge for each mobile terminal, the basic charge, and the tax based on the specified time period, for instance, a thirty-day period.

The charging center 130 informs the mobile communication exchange 120 of the charge for the latest call and the total charge (step 240). The mobile communication exchange 120 receives the charge for the latest call and the total charge, makes them in the form of a short message through the short message generating section 140, and transmits the short message to the mobile terminal subscriber 100 (steps 250 and 260). The mobile terminal 100 then receives the short message, and displays on the LCD the charge for the latest call and the total charge. Preferably, it may display characters such as " Charge for the latest call: 400won, Total charge: 10,500won". Accordingly, the mobile terminal subscriber can immediately confirm the total charge calculated to include the latest call as well as the charge for the latest call.

FIG. 4 is a flowchart illustrating a method of informing a mobile terminal of the total telephone charge in the case that the mobile terminal requests confirmation of the total telephone charge up to now in a standby state according to another embodiment of the present invention.

Referring to FIG. 4, if the mobile terminal subscriber intends to confirm the total telephone charge up to now in a standby state, he/she can request confirmation of the total charge by pressing sequentially keys "*", "1", "1", and "SEND", or a specified key (step 310). If the mobile communication exchange 120 receives the request for the confirmation of the total charge for the mobile terminal 100 through the base station 110, it requests the confirmation of the total charge of the mobile terminal subscriber to the charging center 130 (step 320). The charging center 130 searches the total charging information among information managed for the mobile terminal subscriber, and informs the mobile communication exchange 120 of the total charging

information (step 330). The mobile communication exchange 120 generates a short message corresponding to the total charging information through the short message generating section 140, and transmits the short message to the mobile terminal 100 (steps 340 and 350). The mobile terminal 100 receives the short message, and displays the total charge on the LCD. Preferably, it may display characters such as "Total charge: 10,500won".

As described above, it will be apparent that the present invention provides the advantages that the mobile terminal subscriber can be provided with accurate telephone charge information by enabling the subscriber to immediately confirm the charging information calculated by the charging center through the mobile terminal just after a telephone call using the mobile terminal terminates. Also, the mobile terminal subscriber can selectively confirm at least one charging information among various kinds of charging information managed by the charging center at his/her desired time using the mobile terminal.

While this invention has been described in connection with what is presently considered to be the most practical and preferred embodiments which display both the charge for the latest call and the total charge or only the total charge, it is to be understood that other modifications thereof may be made without departing from the scope of the invention. For example, the accumulated telephone charge for a specified time period desired by the mobile terminal subscriber, or another kind of charges in addition to the charge for the latest call and the total charge can be selectively displayed. Thus, the invention should not be limited to the disclosed embodiment, but should be defined by the scope of the appended claims and their equivalents.

[EFFECT OF THE INVENTION]

As described above, it will be apparent that the present invention provides the advantages that the mobile terminal subscriber can be provided with accurate telephone charge information by enabling the subscriber to immediately confirm the

charging information calculated by the charging center through the mobile terminal just after a telephone call using the mobile terminal terminates. Also, the mobile terminal subscriber can selectively confirm at least one charging information among various kinds of charging information managed by the charging center at his/her desired time using the mobile terminal.

[PATENT CLAIM(S)]

[CLAIM 1]

A method of informing a telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of:

a mobile communication exchange detecting termination of a telephone call of a mobile terminal;

the mobile communication exchange producing charging information for the telephone call;

the mobile communication exchange informing the charging information to a charging center;

the charging center calculating the telephone charge using the charging information and informing the calculated telephone charge to the mobile communication exchange; and

the mobile communication exchange transmitting the telephone charge information via BTS to a mobile terminal.

[CLAIM 2]

The method as claimed in claim 1, wherein the telephone charge is a telephone charge related to the telephone call after termination of the telephone call.

[CLAIM 3]

The method as claimed in claim 2, further comprising the step of the charging center calculating an accumulated telephone charge of the mobile terminal subscriber using the telephone charge, and calculating a total telephone charge by adding a basic telephone charge to the accumulated telephone charge.

[CLAIM 4]

The method as claimed in claim 3, further comprising the step of the mobile

terminal receiving the telephone charge information, and displaying both the telephone charge for the corresponding telephone call and the total telephone charge.

[CLAIM 5]

The method as claimed in claim 1, wherein the telephone charge information is in the form of a short message.

[CLAIM 6]

A method of informing a total telephone charge to a mobile terminal subscriber in a mobile communication system, the method comprising the steps of:

a mobile terminal requesting confirmation of a telephone charge to a mobile communication exchange in accordance with a command of the mobile terminal subscriber;

the mobile communication exchange requesting the confirmation of the telephone charge for the mobile terminal subscriber to a charging center;

the charging center informing the telephone charge to the mobile communication exchange; and

the mobile communication exchange transmitting the telephone charge information via BTS to the mobile terminal.

[CLAIM 7]

The method as claimed in claim 6, wherein the mobile terminal requests the confirmation of a total telephone charge in a standby state.

[CLAIM 8]

The method as claimed in claim 6, wherein the telephone charge is at least one among a telephone charge for a latest call, an accumulated telephone charge, and a total telephone charge selected by the mobile terminal subscriber.

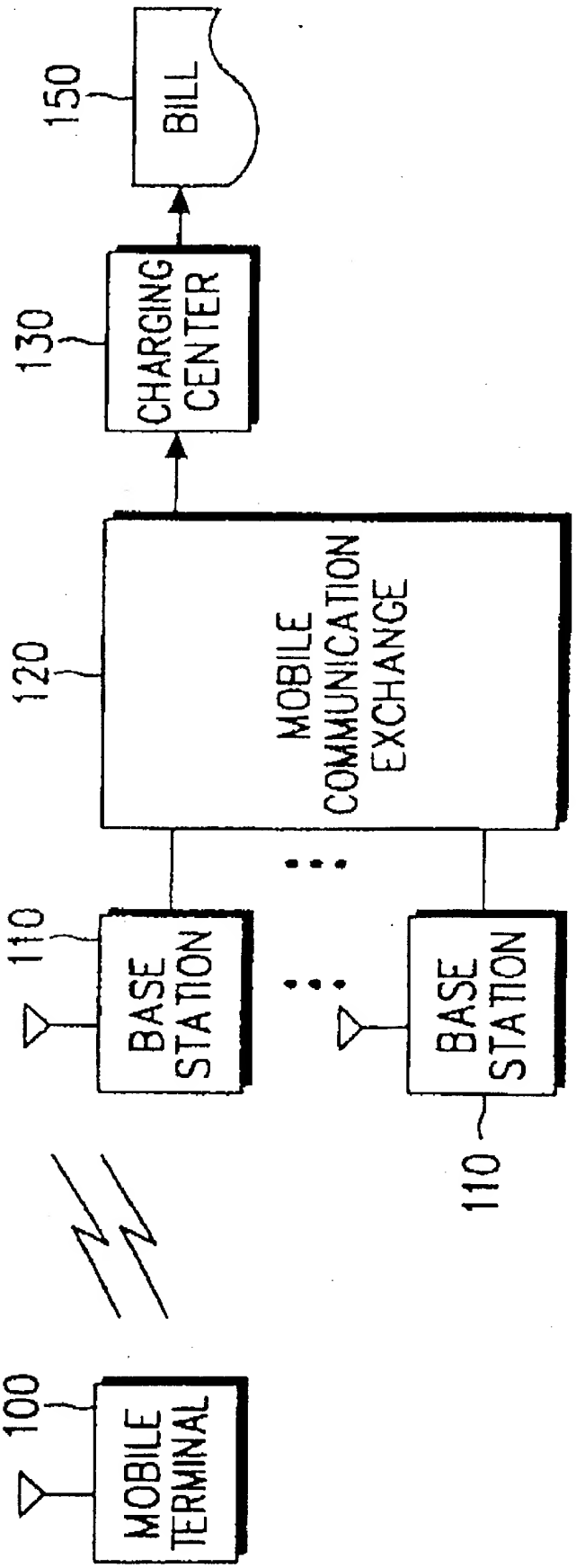

FIG.1

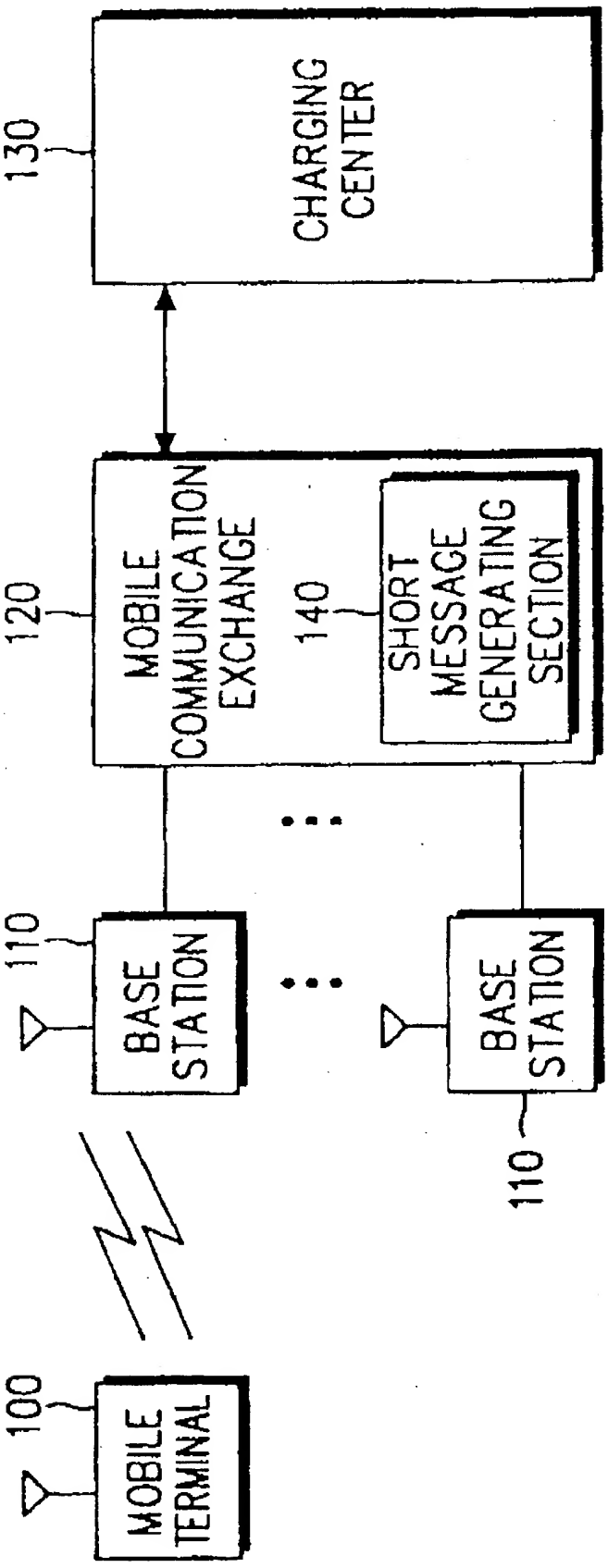

FIG.2

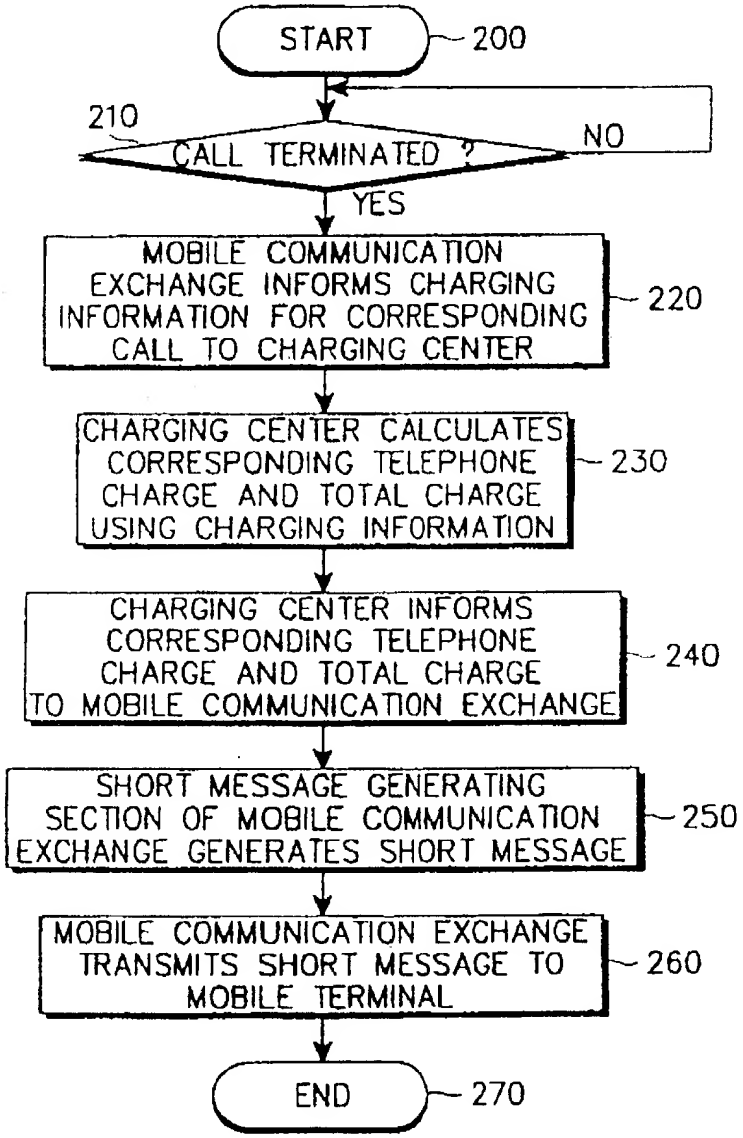

FIG.3

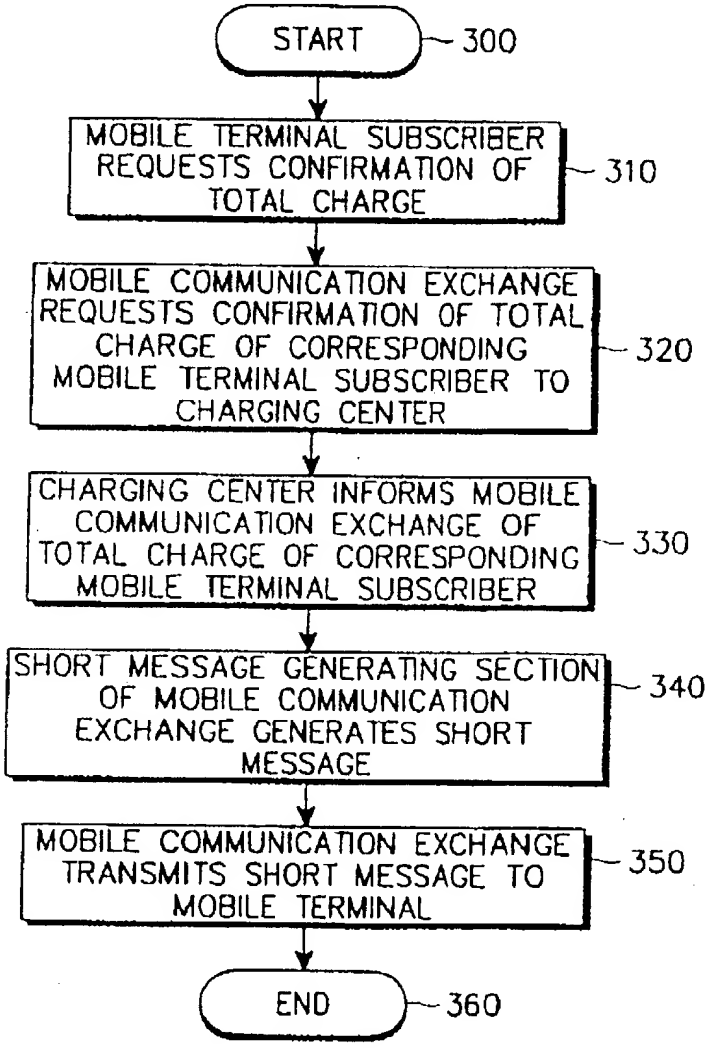

FIG.4